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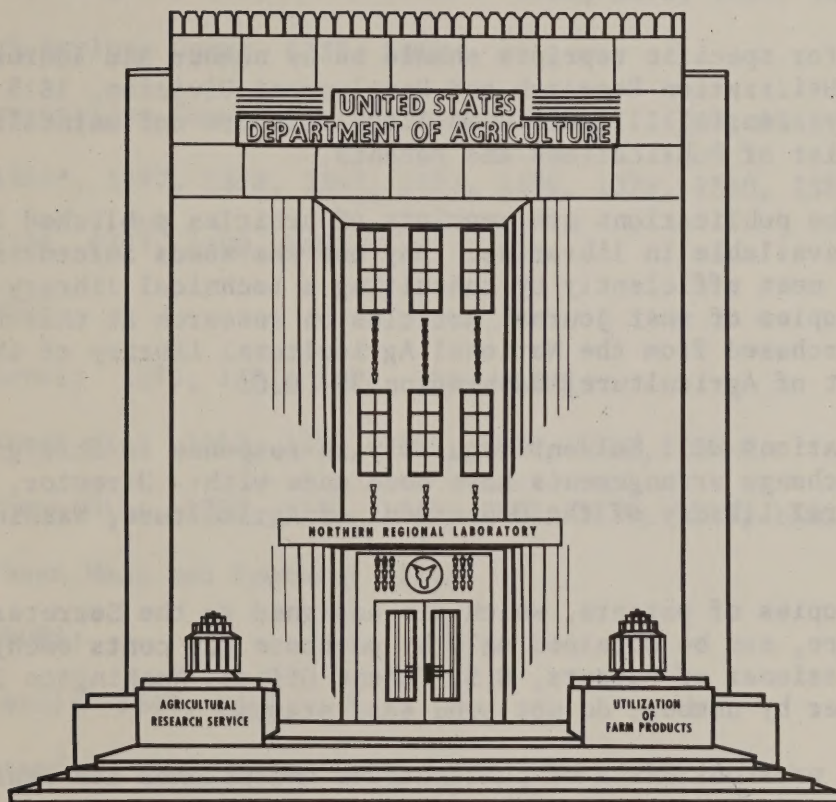
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CURRENT SERIAL RECORDS

## PUBLICATIONS AND PATENTS

of the  
NORTHERN UTILIZATION RESEARCH AND DEVELOPMENT DIVISION  
Peoria, Illinois, for the period

JANUARY - JUNE 1962



Agricultural Research Service

UNITED STATES DEPARTMENT OF AGRICULTURE

Congress in 1938 authorized four regional laboratories to conduct basic and applied research designed to expand, improve, and develop through science and technology the utilization of American farm crops. Agricultural products assigned the Northern Division are: The cereal grains-- corn, wheat, barley, grain sorghum, and oats; the oilseeds-- soybean, flaxseed, safflower, and erucic acid-containing oilseeds; and new crops. The abstracts in this list describe current research on these commodities and indicate progress achieved by the Northern Division.

Northern Division publications are available, in conformance with the policy of the Department of Agriculture, to scientists and other specialists, librarians, representatives of the press, and others interested. Reprints of publications marked with an asterisk (\*) are not available for distribution.

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PUBLICATIONS

[Publications marked (\*) are not available for distribution.  
When requesting reprints, please order by number.]

1276 GRAPHIC AID FOR INTERPRETING GAS CHROMATOGRAMS.

C. D. Evans, Patricia M. Cooney, and E. J. Panek.

J. Am. Oil Chemists' Soc. 39(4): 210-213. April 1962.

A simple semilogarithm plot of elution volumes can be constructed as an aid in identifying components that are members of the same homologous series. This technique is especially useful in organoleptic and flavor studies for identifying small peaks in any gas chromatogram. The method is applicable to chromatograms containing 20 or more peaks, which do not have to be completely resolved. Any member of the homologous series within 4 or 5 carbons of the unknown can be used as a standard for identification. The tentative plots also help in examining chromatograms obtained with hydrogen flame or with  $\beta$ -ray-type detector equipment where samples are too small for collection and identification by chemical and physical tests.

1333 CITRIC ACID: INACTIVATING AGENT FOR METALS OR ACIDIC SYNERGIST IN EDIBLE FATS?

J. C. Cowan, Patricia M. Cooney, and C. D. Evans.

J. Am. Oil Chemists' Soc. 39(1): 6-9. January 1962.

Oxidative stabilities of soybean oil and lard are improved by the addition of either sorbitol or citric acid. Sufficient sorbitol gives enough improvement in stability so that added citric acid gives no increased stability. Both sorbitol and citric acid inactivate added iron. Antioxidant activity of citric acid appears to come primarily, and possibly entirely, from its inactivating capacities.

1335 CARBOXYMETHYL HIGH-AMYLOSE STARCH.

J. W. Sloan, C. L. Mehlretter, and F. R. Senti.

J. Chem. Eng. Data 7(1): 156-158. January 1962.

Carboxymethyl derivatives of a corn starch containing 57% amylose were prepared at different levels of substitution and their properties compared with similar derivatives of waxy corn starch, ordinary corn starch, and amylose from butanol fractionation. Typical polyelectrolyte behavior of the high-amylose derivatives was demonstrated, and temperature-viscosity properties were shown to lie intermediate between those of similar derivatives of ordinary corn starch and of amylose.



The carboxymethyl high-amylose corn starch derivatives were cold water soluble above D.S. 0.2 and did not retrograde. Their paste viscosities showed good heat and alkali stability and minimum setback. Soil-suspending power was superior to ordinary starch derivatives but less than that of commercial carboxymethyl cellulose. Paper handsheets showed no improvement when sized with carboxymethyl high-amylose corn starch, but coated paper had significantly higher bursting strength and fold endurance.

1336 THE HILAR LAYER OF WHITE CORN.

Dorothy Bradbury, M. J. Wolf, and R. J. Dimler.  
Cereal Chem. 39(1): 72-78. January 1962.

The structure, color, and optical density of the hilar layers of several hybrids and inbred lines of white corn were investigated. In many kernels the hilar layer appeared as a single band, but in others it showed a distinctly double nature. Observed in situ, after breaking off the tip caps, hilar layers were light tan, brown, or almost black. Hilar layers were isolated by dissecting away other tissues after the kernel had been boiled for 65 minutes in a 0.5% aqueous solution of KOH. These layers varied in optical density from 0.10 to 1.00. The optical density was presumably affected by the concentration of pigments and by the thickness of the isolated hilar layer.

Possible significance of the variability of the hilar layer to the corn dry-milling industry is pointed out.

1337 POLYMERIC PRODUCTS FROM THE REACTION OF DIALDEHYDE STARCHES WITH CHLORINE IN METHANOL. PREPARATION AND PROPERTIES.

W. C. Schaefer, C. R. Russell, and C. E. Rist.  
Cereal Chem. 39(1): 1-15. January 1962.

Periodate-oxidized corn starch, commonly called dialdehyde starch, at all levels of oxidation was reacted with chlorine dissolved in methanol to give a new series of colorless polymers containing a variety of combinations of aldehyde, carboxyl, and methoxyl groups. These changes in functionality, along with a concurrent reduction in molecular weight, gave products which had lower gelatinization temperatures, lower paste viscosity, less setback, and higher paste clarity than their respective starting dialdehyde starches. Products derived from 20% and higher dialdehyde starches were swollen by cold water. These changes in paste characteristics should, in general, increase the potential utility of dialdehyde starches in applications requiring a hydrophilic colloid.

1339 RAMULOSIN: INHIBITORY EFFECT AGAINST PLANT SEEDS AND VARIOUS FUNGI.

W. F. Hendershot, C. W. Hesseltine, T. G. Pridham, R. G. Benedict, and R. W. Jackson.  
Arch. Biochem. Biophys. 96(1): 166-170. January 1962.

Ramulosin, a new fermentation product reported from this Division was tested for biological activity. The compound inhibited germination of wheat and oats at 10 ppm; tomato and grass seeds at 100 ppm; and corn, clover, sorghum, and morning glory seeds at 1,000 ppm. No



appreciable activity was noted in tests with Pinto and soy beans. Ramulosin also inhibited the germination of conidiospores, ascospores, and sporangiospores of selected fungi. Although it did not exhibit antibacterial activity, ramulosin did retard the growth of several basidiomycetes and ascomycetes.

1340 FIBER DIMENSIONS OF NONWOODY PLANT MATERIALS.

R. E. Perdue, Jr.<sup>1</sup> and H. J. Nieschlag. (<sup>1</sup>USDA Crops Research Division, Beltsville, Md.)  
Tappi 44(11): 776-784. November 1961.

Data on fiber dimensions were compiled from the literature to provide a partial basis for a general evaluation of nonwoody plant materials as sources of paper pulp. Study of these data show that the best raw materials among the monocotyledons are grasses and among the dicotyledons are plants containing large quantities of bast fibers.

1343 NEW CROPS: PUBLICATIONS AND PATENTS FROM THE NORTHERN REGIONAL RESEARCH LABORATORY, 1944-1961.

North. Util. Res. Devlpmt. Div., Agr. Res. Serv., U.S. Dept. Agr.  
ARS-71-19. March 1962. 10 pp. [Processed]

This bibliography represents research results on the chemistry and technology of selected plant species that have been reported in the technical literature by the Northern Division.

1344 \* THE DISCOVERY OF THE GIBBERELLINS IN JAPAN AND EARLY RESEARCH WORK ON THESE SUBSTANCES IN THE UNITED STATES OF AMERICA.

F. H. Stodola.

Proc. Symposium on Gibberellin, Giessen, Germany, December 1-3, 1960.  
pp. 221-224. Berlin. 1962.

The first assumption in 1912 that the bakanae effect might be caused by an invading organism is traced from Kurosawa's original work through the many Japanese investigations between 1930 and 1950, up to the identification and production of the various gibberellins by scientists in the United States in 1953.

1345 HYDROGENATION OF LINOLENATE. IV. KINETICS OF CATALYTIC AND HOMOGENEOUS CHEMICAL REDUCTION.

C. R. Scholfield, Janina Nowakowska, and H. J. Dutton.  
J. Am. Oil Chemists' Soc. 39(2): 90-95. February 1962.

Kinetics for consecutive reactions of octadecatrienoate to octadecadienoate to octadecenoate were studied with the aid of radioisotopic tracers and gas chromatography. Evidence for a triene to monoene shunt was obtained. Similarly, the chemical reduction with hydrazine was studied, but no evidence for this anomalous behavior was obtained.

1346 HYDROGENATION OF LINOLENATE. V. PROCEDURE OF EVALUATING HYDROGENATION CATALYSTS FOR SELECTIVITY.

H. J. Dutton.  
J. Am. Oil Chemists' Soc. 39(2): 95-97. February 1962.



Equations for determining the ratio of hydrogenation rates for linolenate and linoleate acyl groups are derived from kinetic theory. They are based upon the analysis for linolenate after absorption of 0.5 mole of hydrogen by an equal mixture of linoleate and linolenate. This method finds routine application in the evaluation of hydrogenation catalysts for selectivity.

1347 MOLECULAR WEIGHT STUDIES ON GLUTENIN BEFORE AND AFTER DISULFIDE-BOND SPLITTING.

Harald C. Nielsen, G. E. Babcock, and F. R. Senti.  
Arch. Biochem. Biophys. 92(2): 252-258. February 1962.

The unique elastic and cohesive properties of wheat gluten are associated with glutenin. Glutenin, electrophoretically homogeneous, is a mixture of sedimentating species with molecular weights ranging into the millions. Cleaving the disulfide bonds of glutenin either by performic acid oxidation or by reaction with sulfite reduces it to an ultracentrifugally homogeneous species with a molecular weight of 20,000 with an attendant loss of elastic and cohesive properties. It is therefore concluded that glutenin contains a basic polypeptide unit with a molecular weight of 20,000, various numbers of which are linked via disulfide bonds to form the native protein. It is further concluded that the unique elastic and cohesive properties of glutenin depend on the integrity of this disulfide cross-linked structure.

1348 PRODUCTION OF FUMARIC ACID IN 20-LITER FERMENTORS.

R. A. Rhodes, A. A. Lagoda, T. J. Misenheimer, M. L. Smith,  
R. F. Anderson, and R. W. Jackson.  
Appl. Microbiol. 10(1): 9-15. January 1962.

The conditions necessary to make fumaric acid in 20-liter fermentors by fermentation of glucose with Rhizopus arrhizus NRRL 2582 were determined. Continuous neutralization of fumaric acid was necessary for optimum yields. Yields of the calcium salt were in excess of 65 grams of fumaric acid from 100 grams of sugar consumed during fermentation of sugar concentrations of 10-16%. Conditions established for calcium fumarate production include a simple mineral salts medium containing 10-16% sugar, 0.5 v/v/minute aeration rate, 300 rpm. agitation rate in a baffled tank, 35° C. incubation temperature, CaCO<sub>3</sub> to neutralize the acid formed, and a 4-5% (v/v) vegetative inoculum. A suitable procedure and medium for the preparation of a vigorous vegetative inoculum were established. The tendency for calcium fumarate fermentations to foam excessively was controlled with a proper antifoam agent added before sterilization of the medium and again at daily intervals during fermentation. The production of soluble sodium or potassium fumarates was inhibited when the concentration of fumarates reached 3.5-4.0%. No means of overcoming this inhibition was found. Starches and certain other grain-derived carbohydrates were fermented to form calcium fumarate in flask experiments with approximately the same efficiency as was glucose.



- 1349 PROPOSAL TO DESIGNATE STRAIN ATCC 3004 (IMRU 3004) AS THE NEOTYPE STRAIN OF STREPTOMYCES ALBUS (ROSSI-DORIA) WAKSMAN AND HENRICI.  
A. J. Lyons, Jr. and T. G. Pridham.  
J. Bacteriol. 83(2): 370-380. February 1962.

It is proposed that strain ATCC 3004 (IMRU 3004) be designated as the neotype strain of Streptomyces albus (Rossi-Doria) Waksman and Henrici and as the type strain of the genus Streptomyces Waksman and Henrici. The proposal is based not only on the fact that the holotype strain [Streptotrix (sic) alba] of Rossi-Doria is no longer extant, but also on the fact that a study of the literature and a taxonomic study of 55 strains of the organism indicate the species should exhibit these characteristics: catenulate ovoidal spores; white aerial mycelium; coiled sporophores; proteolytic activity; and nonchromogenicity (inability to form brown, deep-brown, or black diffusible pigments). Strain ATCC 3004 (IMRU 3004) exhibits these characteristics, as do 16 other acquisitions. Study of the 16 additional strains that conform with the general definition of the species shows differences in some physiological characteristics. It is suggested that these differences are of subspecific significance.

- 1350 THE ACID-BASE-CATALYZED CONVERSION OF ALDOHEXOSE INTO 5-(HYDROXYMETHYL)-2-FURFURAL.  
M. L. Mednick.  
J. Org. Chem. 27(2): 398-403. February 1962.

Either glucose or starch, in water containing weak acids and weak bases, is converted at 150-250° C. into 5-(hydroxymethyl)-2-furfural in maximum yields considerably higher than those obtained with acid catalysts alone. A reaction pathway is proposed involving the isomerization of glucose to fructose followed by dehydration.

- 1351 HYDROLYSIS OF DIALDEHYDE STARCH. GLYOXAL AND ERYTHROSE PRODUCTION IN SULFUROUS ACID-BARIUM SULFITE SOLUTIONS.  
C. A. Wilham, T. A. McGuire, J. W. Van Cleve, F. H. Otey, and C. L. Mehlretter.  
Ind. Eng. Chem. Product Research and Develop. 1(1): 62-64. March 1962.

The protective action of barium sulfite permits hydrolysis of a high concentration of dialdehyde starch with sulfurous acid to produce glyoxal and erythrose. Reduction of erythrose to erythritol provides a polyol of potential commercial use.

- 1352 ALKYD RESINS MODIFIED WITH CYCLIC FATTY ACIDS. A PRELIMINARY EVALUATION.  
W. R. Miller, H. M. Teeter, A. W. Schwab, and J. C. Cowan.  
J. Am. Oil Chemists' Soc. 39(3): 173-176. March 1962.

Alkyd resins were modified to 50% oil length with crude, flash-distilled, and 78% pure cyclic fatty acids. These resins were compared with ones modified with naturally occurring fatty acids and with vegetable oils. Those modified with the cyclic acids processed more rapidly than those prepared with linseed, safflower, or soybean



fatty acids; and they also had good nonyellowing properties. Resins modified with 78% pure cyclic acids showed definite improvement in drying time, hardness, and chemical resistance in air-dried films, and an almost equal improvement in baked films, over resins obtained with the other modifiers. Distilled cyclic acids also improved alkyd resins although not to the extent that pure acids do. Both gave resins superior to commercial oil-modified resins under the test conditions. Resins with crude cyclic acids were as good in air-dried films as the others, but were poorer in baked films.

1353 LUNARIA SEED OIL--A RICH SOURCE OF C<sub>24</sub> FATTY ACIDS.

T. L. Wilson, C. R. Smith, Jr., and I. A. Wolff.  
J. Am. Oil Chemists' Soc. 39(2): 104-105. February 1962.

The seed oil of Lunaria biennis (family Cruciferae) contains 21% of cis-15-tetracosenoic acid. This proportion of C<sub>24</sub>-monoethenoid acid is the highest yet reported in any seed oil. The oil also contains cis-13-docosenoic (erucic) acid (42%).

1354 SEARCH FOR NEW INDUSTRIAL OILS. VI. SEED OILS OF THE GENUS LESQUERELLA.

K. L. Mikolajczak, F. R. Earle, and I. A. Wolff.  
J. Am. Oil Chemists' Soc. 39(2): 78-80. February 1962.

Fatty acid composition of seed oil from 14 species of the genus Lesquerella has been determined by gas-liquid chromatography. All but two species contain hydroxyeicosenoic acid in amounts ranging from 45-74%. The remaining two species contain about 50% C<sub>18</sub>-hydroxy acids but no C<sub>20</sub>-hydroxy acid.

1355 AMINO ACID COMPOSITION OF LESQUERELLA SEED MEALS.

Roger Wayne Miller, C. H. VanEtten, and I. A. Wolff.  
J. Am. Oil Chemists' Soc. 39(2): 115-117. February 1962.

Seed meals from 14 species of Lesquerella, family Cruciferae, were analyzed for 18 amino acids. Lysine and methionine contents ranged, respectively, from 331-440, and from 72-94 mg. per gram of nitrogen. When compared with nine species of Brassica (rape, mustard), Lesquerella seeds were higher in lysine and lower in methionine. Thirteen unidentified substances were detected by the ion-exchange chromatographic method used to determine amino acids.

1356 \* PREPARATION AND SOLUBILIZATION OF PARTICLES: CHROMATOPHORES.

J. W. Newton  
"Methods in Enzymology," vol. V, Chap. 7, pp. 73-77. New York. 1962.

Media methods of isolation and properties of the two general types of photosynthetic bacteria, photoheterotrophs and autotrophs, are given.



- 1357 MICROBIOLOGICAL PRODUCTION OF CAROTENOIDs. VIII. INFLUENCE OF HYDROCARBON ON CAROTENOGENESIS BY MATED CULTURES OF BLAKESLEA TRISPORA. Alex Ciegler, George E. N. Nelson, and Harlow H. Hall. Appl. Microbiol. 10(2): 132-136. March 1962.

Synthesis of  $\beta$ -carotene by mated strains of Blakeslea trispora in shaken-flask culture was considerably enhanced by adding either 5% kerosene after 2 days of fermentation or acid-refined kerosene at the start of fermentation to a grain-based medium that also contained a natural lipid, nonionic detergent, and  $\beta$ -ionone; average yields of 17,500  $\mu\text{g/g}$  of dry fermentation solids (86,000  $\mu\text{g}/100\text{ ml}$  of medium) were attained when refined kerosene was used. Almost all the carotene was retained within the mycelium. Peak yields were achieved in 5 days.

- 1358 PRODUCTION OF A NEW POLYSACCHARIDE WITH CRYPTOCOCCUS LAURENTII VAR. FLAVESCENS. Martin C. Cadmus, Adolph A. Lagoda, and Ralph F. Anderson. Appl. Microbiol. 10(2): 153-156. March 1962.

Conditions were investigated for the production of a new gum by the yeast Cryptococcus laurentii var. flavescens NRRL Y-1401 in shaken flasks and 20-liter fermentors. The most suitable medium contained 6% commercial glucose, 0.25% autolyzed brewers' yeast, and 0.001%  $\text{MnSO}_4$  and had an initial pH of 6.5. Polysaccharide yields, as measured by the dry weight of the alcohol precipitates, were in the range of 30-35% based on initial glucose.

- 1359 NEW SOURCES OF SEED MUCILAGES. H. L. Tookey, R. L. Lohmar, I. A. Wolff, and Quentin Jones.<sup>1</sup> (1USDA Crops Research Division, Beltsville, Md.) J. Agr. Food Chem. 10(2): 131-133. March-April 1962.

Seeds of 175 species in 26 plant families were examined for water-soluble mucilage content. Those containing over 15% mucilage were all from legumes. Twenty mucilages, previously unreported, are galactomannans with mannose-galactose ratios between 4:1 and 1:1.

- 1360 EXPERIMENTAL WET MILLING OF HIGH-AMYLOSE CORN. R. A. Anderson and E. L. Griffin, Jr. Am. Miller 90(3): 10-12, 19. March 1962.

High-amylose corn hybrids containing starch with 57 and 67% amylose contents were wet milled and their processing characteristics compared to an ordinary dent corn.



1362 \* X-RAY DIFFRACTION POWDER PATTERNS.

F. R. Senti and H. F. Zobel.

"Methods in Carbohydrate Chemistry," vol. I, pp. 535-539.  
New York. 1962.

In the physical measurement of carbohydrates, the positions and relative intensities of the lines that comprise the x-ray pattern of a finely divided crystal can be used for its identification. Powder patterns are discussed with respect to equipment needed for their production, procedures used in preparing and mounting samples for x-ray, and the identity of one pattern with another or with a table of spacings and relative line intensities. Unlike infrared and ultraviolet absorption spectra, x-ray powder patterns generally do not show features that are characteristic of particular functional groups.

1363 \* DETERMINATION OF REDUCING SUGARS AND CARBOHYDRATES.

J. E. Hodge and B. T. Hofreiter.

"Methods in Carbohydrate Chemistry," vol. I, pp. 380-394.  
New York. 1962.

Chromatographic methods provide more generally applicable purification procedures and a separation of the component sugars so that they may be identified before assay--a decided advantage. The Somogyi micro copper method (in several variations), the phenol-sulfuric acid colorimetric method, and an anthrone colorimetric method are presented as the most suitable for assays in conjunction with chromatographic separations in agricultural chemical research.

1364 \*  $\alpha$ -LACTULOSE (4-O- $\beta$ -D-GALACTOPYRANOSYL- $\alpha$ -D-FRUCTOSE). REARRANGEMENT OF LACTOSE TO LACTULOSE IN ALKALINE SOLUTION.

Edna M. Montgomery.

"Methods in Carbohydrate Chemistry," vol. I, pp. 325-328.  
New York. 1962.

A procedure for synthesis of a ketose,  $\alpha$ -lactulose (4-O- $\beta$ -D-galactophyransyl- $\alpha$ -D-fructose), from the aldose, lactose, is described. In the method, which has been used to prepare the crystalline ketose in considerable quantity, conditions obtained permit (1) rearrangement of aldose to ketose in alkaline media with minimum side reactions and (2) separation of newly formed ketose from mixture of aldoses and decomposition products formed in alkaline treatment of an aldose.

1365 \* D-MANNO-HEPTULOSE. EPIMERIZATION OF D-GLYCERO-D-GALACTO-HEPTULOSE IN PYRIDINE.

Edna M. Montgomery.

"Methods in Carbohydrate Chemistry," vol. I, pp. 175-176.  
New York. 1962.

This procedure describes epimerization of the aldose, D-glycero-D-galacto-heptose, in pyridine to yield only one ketose, D-manno-heptulose, isolated as crystalline sugar in a yield of 21%. For



structural considerations, the method is alternative to more drastic rearrangement in alkali. In barium hydroxide the aldose forms two ketoses, D-manno-heptulose and D-gluco-heptulose, in yields of 25 and 13%, respectively.

1366 REFRACTIVE INDICES OF WHEAT STARCH GRANULES AT VARIOUS MOISTURE LEVELS DETERMINED WITH AN INTERFERENCE MICROSCOPE.

M. J. Wolf, Veronica J. Ruggles, and Majel M. MacMasters.  
Biochim. Biophys. Acta 57(1): 135-142. February 1962.

Refractive indices of wheat starch granules, equilibrated at moisture levels within the range 0-21% moisture, were estimated at 436 and 546 m $\mu$  in silicone immersion media. A two-wavelength procedure and an object-immersion liquid interpolation method were compared; the data were in satisfactory agreement. The two-wavelength procedure is the more rapid.

Refractive indices of the granules showed little change between 0 and 10% moisture. Between 12 and 21% moisture, the rate of change in refractive index is approximately 0.004 for a change of 1 percentage unit in starch moisture. Within this range, a change of 1 percentage unit or less in starch moisture is detectable with an interference microscope.

1367 RHOPALOMYCES AND SPINELLUS IN PURE CULTURE AND THE PARASITISM OF RHOPALOMYCES ON NEMATODE EGGS.

J. J. Ellis and C. W. Hesseltine.  
Nature 193(4816): 699-700. February 17, 1962.

Spores of seven different isolates of Rhopalomyces elegans were germinated, and the isolates were successfully grown in pure culture. All seven strains parasitized young nematode eggs. Pure cultures of Spinellus were also successfully grown from parasitized mushrooms. The procedures used are described briefly.

1368 FLASH DESOLVENTIZING DEFATTED SOYBEAN MEALS WASHED WITH AQUEOUS ALCOHOLS TO YIELD A HIGH-PROTEIN PRODUCT.

G. C. Mustakas, L. D. Kirk, and E. L. Griffin, Jr.  
J. Am. Oil Chemists' Soc. 39(4): 222-226. April 1962.

The application of a previously developed vapor-type flash desolventizer was extended to recover dilute alcohols from soybean marcs. Soybean protein meals are debittered by washing with aqueous alcohols to yield a better-flavored product with a significant increase in protein content. The protein content of defatted meal was increased from about 50-70 or 75% by washing with methanol, ethanol, or isopropanol in a concentration range of 50-70%. System modifications and critical variables were investigated so as to minimize residual alcohol under conditions that preserve a high-quality product. The products were light-colored, granular, and free flowing.



- 1369 PURIFICATION OF ERUCIC ACID BY LOW-TEMPERATURE CRYSTALLIZATION.  
J. W. Hagemann, K. L. Mikolajczak, and I. A. Wolff.  
J. Am. Oil Chemists' Soc. 39(4): 196-197. April 1962.

Purification of erucic acid for laboratory use by low-temperature crystallization from aqueous acetone, ethanol, and methanol has been investigated. Two crystallizations of technical grade commercial acid (76-86%) from acetone-water (5:1) provided products of 94-98% purity, depending on the original composition; residual impurities were primarily C<sub>20</sub>-monoene and C<sub>22</sub>-saturated acids.

- 1370 PREPARATION OF FOAMS FROM VEGETABLE OIL DERIVATIVES.  
C. M. Thierfelder, H. M. Teeter, and J. C. Cowan.  
J. Am. Oil Chemists' Soc. 39(4): 215-217. April 1962.

Dimer acid was hydroxyethylated at 110-240° C. in the presence of alkaline catalysts. Products having ethylene oxide:dimer acid mole ratios of 0.8 to 1.4 were transformed into flexible urethane foams of density 2.0 to 4.4 lb./cu. ft. Hydrogenated "aldehyde oil" gave a rigid foam, which had a density of 1.2 lb./cu. ft.

- 1371 \* LIST OF PUBLICATIONS AND PATENTS: OILSEEDS AND RELATED SUBJECTS, 1961.  
North. Util. Res. Devlpmt. Div., Agr. Res. Serv., U.S. Dept. Agr.  
ARS-71-5, Suppl. 7. April 1962. 5 pp. [Processed]

This bibliography represents research results on the chemistry and technology of oilseeds, particularly soybeans, flax, safflower, and selected plant species, that have been reported in the literature by the Northern Division during 1961.

- 1372 HIGH EFFICIENCY WET-STRENGTH PRODUCTION BY DIALDEHYDE STARCH IN CLOSED WHITE WATER SYSTEMS.  
B. T. Hofreiter, G. E. Hamerstrand, D. J. Kay, and C. E. Rist,  
Tappi 45(3): 177-181. March 1962.

The use of dialdehyde starch (DAS) as a wet-strength additive for paper has been studied by making handsheets in a closed white-water system. Wet- and dry-strength increases and their relation to DAS application levels and retentions have been determined. This work demonstrates that DAS can produce a given degree of wet strength at much lower levels of application to the pulp than previously reported. Wet-strength increases obtained have averaged 500% when applying 0.25% DAS in combination with 1.5% cationic starch as a retention aid. These increases were achieved along with retentions of DAS from 82-96% in studies with four softwood pulps (bleached and unbleached sulfate, bleached sulfite, and semibleached groundwood). It is concluded that DAS is a highly efficient agent for achieving practical wet-strength properties at very low levels of application.



- 1373 PHOSPHATE LINKAGES IN PHOSPHOMANNANS FROM YEAST.  
M. E. Slodki.  
Biochim. Biophys. Acta, 57(3): 525-533. March 1962.

D-Mannose 6-phosphate has been identified as the sole phosphorylated component in acid hydrolyzates of both Hansenula capsulata NRRL Y-1842 and H. holstii NRRL Y-2448 phosphomannans. Phosphomannans are polymannosidic phosphodiester in which one secondary phosphoryl is linked as mannose 6-phosphate and the other as  $\alpha$ -hemiacetal phosphate.

- 1374 PREPARATION OF DRY VITAL GLUTEN.  
R. A. Anderson and C. Vojnovich.  
Baker's Dig. 36(2): 69-70. April 1962.

A review is presented of known methods for preparing dry vital wheat gluten. A detailed description of the drum-drying procedure developed at this laboratory is given.

- 1375 CAROTENOIDS OF CORN AND SORGHUM. I. ANALYTICAL PROCEDURE.  
C. W. Blessin.  
Cereal Chem. 39(3): 236-242. May 1962.

An improved procedure for determining total carotenes and total xanthophylls was developed to serve as a basis for studying the variation of carotenoid pigments in corn and sorghum. The method, based on chromatography and spectrophotometry, is also applicable to grain fractions from wet or dry milling. Relative amounts of noncarotenoid pigments are also estimated by the improved procedure. Other factors influencing the determinations are covered.

- 1376 NATURAL VARIATION OF STREPTOMYCES VIRIDIOCHROMOGENES (KRAINSKY) WAKSMAN ET HENRICI.

L. A. Lindenfelser and T. G. Pridham.  
"Developments in Industrial Microbiology," vol. 3, pp. 245-256. New York. 1962. Proc. 18th Gen. Meeting Soc. Ind. Microbiol., Purdue University, Lafayette, Indiana, August 27-31, 1961.

One thousand single-spore isolates from strain Streptomyces viridochromogenes (Krainsky) Waksman et Henrici NRRL B-1511 were studied to determine types and ranges of natural variation. The isolates were examined for differences in morphology of sporophores, color of aerial and vegetative mycelium, diffusible pigment produced, hydrogen sulfide production, ability to utilize L-arabinose, L-rhamnose, and D-xylose, and ability to produce antibiotics.

Morphology of sporophores was determined from microscopic examination of aerial and vegetative mycelium. Diffusible pigments were compared after growth of the isolates on three different agar media. Antibiotic production was determined by paper-disc assay of culture filtrates using 11 test organisms, including 7 bacteria, 3 fungi,

and 1 yeast. Because all the isolates produced small amounts of antibiotic active against one of the assay organisms, Bacillus subtilis NRRL B-765, culture filtrates from each of the 1,000 strains were studied by means of paper strip chromatography, to discover possible differences based on the antibiotics the isolates produced. The stability of S. viridochromogenes NRRL B-1511, which explains the wide distribution of the species in nature and its ease of isolation, is pointed up in this study.

1378 AFTER DRY, WHAT? A GENERAL SURVEY.

John C. Cowan.

Offic. Dig., Federation Soc. Paint Technol. 34(449): 561-574.  
June 1962.

Reactions involved in the formation and deterioration of films derived from drying oils and polymeric products are reviewed. Specific attention is directed toward free radical reactions involved in autoxidation including film formation and deterioration, driers, and termination reactions. Relative reactivities of organic groups, effect of ultraviolet and other radiation under high vacuum, protection against oxidation and ultraviolet light, intramolecular cleavage reactions, and pigments are among the subjects surveyed.

1379 ENZYMATIC UTILIZATION OF GLUCOSE BY A BASIDIOMYCETE.

H. P. Meloche, Jr.

J. Bacteriol. 83(4): 766-774. April 1962.

Cell-free enzyme preparations from Lactarius torminosus NRRL 2900 were studied to determine the pathway of glucose dissimilation by this organism. The enzyme system can oxidize pentose-phosphate pathway intermediates, but the presence of certain glycolytic enzymes could not be demonstrated. Apparently the pentose-phosphate pathway may be a major mechanism of glucose dissimilation in L. torminosus.

1380 PYRUVIC ACID, A UNIQUE COMPONENT OF AN EXOCELLULAR BACTERIAL POLYSACCHARIDE.

J. H. Sloneker and Danute G. Orentas.

Nature 194(4827): 478-479. May 5, 1962.

The high-viscosity, water-soluble gum produced exocellularly by the bacterium Xanthomonas campestris NRRL B-1459 contains about 3% pyruvic acid as a structural component. The other components are D-glucose, D-mannose, D-glucuronic acid, and acetic acid. Preliminary studies indicate that the pyruvic acid is attached as a ketal to the glucose moiety, presumably as a crosslinkage between two glucose units. A colorimetric procedure for quantitative determination of pyruvic acid combined in the polysaccharide was established on the basis of reaction with 2,4-dinitrophenylhydrazine.



1381 IMMUNOCHEMICAL STUDIES ON DISULFIDE BONDING IN THE PHOTOCHEMICAL APPARATUS OF RHODOSPIRILLUM RUBRUM.

J. W. Newton.

Biochim. Biophys. Acta 58(3): 474-485. April 1962.

An immunochemical study has been made of chromatophores of Rhodospirillum rubrum and of fragments obtained from these cell particles by sonic irradiation and chemical treatment. Serologically univalent material is released from chromatophores by chemical scission of disulfide bonds. The data indicate that chromatophore antigens are inserted into the structure as a repeating matrix of antigenic sites spaced with the determinant groups placed between each pair of disulfides. Evidence for the reversibility of antigen scission and information about the nature of the chromatophore subunits are given.

1382 A NEW GENUS OF MONILIALES HAVING PENICILLI SUBTENDED BY STERILE ARMS.

J. J. Ellis and C. W. Hesseltine.

Bull. Torrey Botan. Club 89(1): 21-27. January 1962.

Gliocephalotrichum gen. nov. is described with the single, type species G. bulbilium. It is distinguished by having a whorl of typically four determinate, sterile, hairlike arms subtending a gloiosporous, compound penicillus on a simple conidiophore and by producing multicellular, intercalary chlamydospores in the filaments. When sown thickly on media, the oblong-elliptical conidia fuse irregularly upon germination.

1383 REACTIONS OF UNSATURATED FATTY ALCOHOLS. XIII. COPOLYMERS OF UNSATURATED FATTY VINYL ETHERS AND CYCLIC MONOMERS.

E. J. Dufek, L. E. Gast, and H. M. Teeter.

J. Am. Oil Chemists' Soc. 39(3): 238-241. May 1962.

Conjugated linseed, conjugated soybean, and nonconjugated linseed vinyl ethers were copolymerized with various cyclic comonomers. The comonomers used were dihydroabietyl, cyclohexyl, 5-norbornene-2-methyl, di- and tetra-hydrodicyclopentadienyl vinyl ethers, and cyclo- and methylcyclopentadiene.

All copolymers containing a cyclic comonomer gave baked films that have outstanding hardness and alkali resistance. Several of these copolymers air-dried overnight to moderately hard, wrinkle-free films.

The improvement in hardness and alkali resistance may be caused by the steric effects of the cyclic comonomers. These hold the fatty side chains apart thus increasing the proportion of intermolecular to intramolecular crosslinking.

1384 PREPARATION AND PURITY OF LINOLEIC ACID FROM COMMERCIAL CORN, COTTONSEED, AND SAFFLOWER OILS.

B. Sreenivasan, J. B. Brown,<sup>1</sup> E. P. Jones, V. L. Davison, and Janina Nowakowska (<sup>1</sup>Department of Physiological Chemistry, Ohio State University, Columbus).

J. Am. Oil Chemists' Soc. 39(3): 255-259. May 1962.

Linoleic acid from commercial corn, cottonseed, and safflower oils was prepared by low-temperature crystallization using acetone and petroleum ether as solvents; temperatures ranged between -70° and 50° C. This method has the advantages of simple equipment and of flexibility in preparatory capacity. The crystalline fraction obtained at -55° was shown to be "pure" linoleic acid.

Isomerization with potassium tertiary butoxide, oxidative cleavage by periodate-permanganate method, and analysis by liquid-liquid and gas-liquid partition chromatography were used to ascertain the purity and the presence of isomers in the final product. This fraction contained 90-95%, 9,12-dienoic acid; approximately 5% of dienes with the first double bond at the C<sub>8</sub> position and the second bond either at the C<sub>12</sub> or C<sub>13</sub> positions; and small amounts of nonconjugatable 9,15-cis,cis-dienes. Linoleic acid from these oils was similar in composition, except that from corn oil showed the presence of diene with the first double bond at the C<sub>11</sub> position.

1385 ISOTHIOCYANATES FROM ENZYMATIC HYDROLYSIS OF LESQUERELLA SEED MEALS.

M. E. Daxenbichler, C. H. VanEtten, H. Zobel, and I. A. Wolff.

J. Am. Oil Chemists' Soc. 39(3): 244-245. May 1962.

Enzymatic hydrolyzates from seed meals of 17 species of the genus Lesquerella, family Cruciferae, were examined for thiooxazolidones and volatile isothiocyanates. Quantitative estimates of the total volatile isothiocyanates, calculated as butenyl, ranged from 0.6-13.0 mg. per gram of solvent-extracted meal. No thiooxazolidone was found. By means of paper chromatography, melting point, and x-ray patterns of the thiourea derivatives, the volatile isothiocyanates, 3-methylthiopropyl-4-methylthiobutyl-, and 6-methylthiohexyl-, were identified in the hydrolyzates from three species. Evidence for identity of isothiocyanates in hydrolyzates from the remaining species was obtained by paper chromatography of the thiourea derivatives.

1386 REACTIONS OF UNSATURATED FATTY ALCOHOLS. XIV. PREPARATION AND PROPERTIES OF STYRENATED FATTY VINYL ETHER POLYMERS.

Wilma J. Schneider, L. E. Gast, A. W. Schwab, and H. M. Teeter.

J. Am. Oil Chemists' Soc. 39(3): 241-244. May 1962.

New polymeric products have been prepared from conjugated linseed vinyl ether polymers and styrene. Up to 64% by weight of styrene can be incorporated by heating the preformed fatty vinyl ether polymer and monomeric styrene in an aromatic solvent. If a vinyl



ether polymer of low molecular weight (approximately 1,500) is used, more styrene can be incorporated than with a medium molecular weight polymer (approximately 4,000). Films of these styrenated vinyl ether polymers exhibit excellent gloss, color, and hardness, and they also show good flexibility and adhesion. Their resistance to 5% aqueous alkali is outstanding. The films air-dry after curing several days at room temperature. Some styrenated polymers are compatible with long oil alkyd, urea, epoxy, hydrogenated rosin, and polyurethane resins.

- 1387 THE INTERACTION BETWEEN ZINC OXIDE AND TITANIUM DIOXIDE IN WATER.  
L. H. Princen and Marilyn J. DeVena.  
J. Am. Oil Chemists' Soc. 39(3): 269-272. May 1962.

A mechanism is proposed for the reaction between zinc oxide and titanium dioxide in water. Between certain limits of weight ratios of zinc oxide and titanium dioxide definite increases in viscosity, pH, and sedimentation volumes with time have been observed that support the belief that tridimensional structures are formed from the individual particles. The same mechanism may be responsible for some of the thickening in emulsion paints containing these mixed pigments.

- 1390 NUTRITION AND METABOLIC PRODUCTS OF LACTARIUS SPECIES.  
L. G. Jayko, T. I. Baker, R. D. Stubblefield, and R. F. Anderson.  
Can. J. Microbiol. 8(3): 361-371. June 1962.

Nutritional requirements and fermentative products of some Lactarius species were studied. Certain physical and chemical factors affecting growth in submerged culture were elucidated. The fermentation products identified were  $\beta$ -carotene, ergosterol, and 7-dehydrocholesterol.

- 1391 WHEAT GLUTEN AND ITS GLUTENIN COMPONENT: VISCOSITY, DIFFUSION AND SEDIMENTATION STUDIES.  
N. W. Taylor and J. E. Cluskey.  
Arch. Biochem. Biophys. 97(2): 399-405. May 1962.

Gluten from Ponca wheat was fractionated by precipitation with aqueous buffers into glutenin and the soluble gliadin fraction. The glutenin in pH 3.1 buffers had a high intrinsic viscosity, which increased markedly with lowering of ionic strength. It had a broad distribution of sedimenting components of high molecular weight and was highly heterogeneous in diffusion. Glutenin thus approximates a randomly coiled polyelectrolyte with a broad distribution of molecular size.

- 1392 CONDENSATION POLYMERS FROM 3,9-BIS(7-CARBOMETHOXYHEPTYL)-2,4,8,10-TETRAOXASPIRO[5.5]UNDECANE. II. POLY(AMIDE-ACETALS).  
E. H. Pryde, D. J. Moore, H. M. Teeter, and J. C. Cowan.  
J. Polymer Sci. 58(166, pt. 2a): 611-620. April 1962.

3,9-Bis(7-carbomethoxyheptyl)-2,4,8,10-tetraoxaspiro[5.5]-undecane (the pentaerythritol acetal of methyl azelaaldehyde) undergoes condensation polymerization with diamines to give linear polymers, either alone or in conjunction with dimethyl azelate. These novel, linear poly(amide-acetals) are susceptible to crosslinking by p-toluenesulfonic acid and by various metal oxides and salts, such as zinc oxide, zinc acetate, litharge, and magnesium oxide. The crosslinked polymers are insoluble, infusible, transparent solids which strongly adhere to glass.

1393    PROGRESS REPORT ON FLOUR FRACTIONATION--(Part I).

PROGRESS REPORT ON CEREAL FLOUR FRACTIONATION--Part II.

A. C. Stringfellow, V. F. Pfeifer, and E. L. Griffin, Jr.

Am. Miller 90(4): 18-21. April 1962; (5): 22-23. May 1962.

Results are presented on the range of values for protein, ash, fat, particle size, and yield obtained through fine grinding and air classification of cereal flours into several separated fractions. Part I covers wheat; Part II covers sorghum, rice, and yellow and white corn flours.

Photomicrographs are shown of as-milled wheat flour and of the principal air-classified fractions.

1394    MICRO-ORGANISMS.

Harlow H. Hall and John L. Etchells.<sup>1</sup> (<sup>1</sup>Southern Utilization Research and Development Division, Raleigh, N.C.)

Yearbook Agr., 1962.

U.S. Dept. Agr. Pp. 450-453.

Almost every phase of life is influenced in some way by a microorganism or by a microbial process. Bacteria, molds, and yeasts are common microorganisms, but no less vital are the algae, protozoa, and viruses. The diverse chemical products formed by microorganisms through their growth and cell activity contribute to man's well-being.

1395    CEREALS.

F. R. Senti and G. O. Kohler.<sup>1</sup> (<sup>1</sup>Western Utilization Research and Development Division, Albany, Calif.)

Yearbook Agr., 1962.

U.S. Dept. Agr. Pp. 460-465.

The story of wheat unfolds the changes brought by time and technology to cereal grains known even in ancient times. To utilize fully their abundance, scientists are developing from cereal grains new, more acceptable foods for the domestic market and for expanding exports, and are creating a variety of new industrial products.



- 1396 THE SEARCH FOR NEW CROPS.  
Ivan A. Wolff and Quentin Jones.<sup>1</sup> (<sup>1</sup>USDA Crops Research Division,  
Beltsville, Md.)  
Yearbook Agr., 1962.  
U.S. Dept. Agr. Pp. 473-476.

Chemical investigations and botanical evaluations are being undertaken to discover and develop new crops for American agriculture. New sources are being found of useful seed oils, proteins, carbohydrate gums, and pulp fibers.

- 1397 PROPERTIES OF FILMS FROM BACTERIAL POLYSACCHARIDE B-1459.  
Paul R. Watson, Allene Jeanes, and Carl E. Rist.  
J. Appl. Polymer Sci. 6(21): S12-S13. May/June 1962.

Unsupported films of good quality can be made from an aqueous solution of the exocellular polysaccharide produced from glucose by Xanthomonas campestris NRRL B-1459. Films of even better quality result by merely heating the aqueous solution of the native polysaccharide to 80° C. before casting the film (from a cooled solution) or by using deacetylated polysaccharide. Characteristics of the films demonstrate properties of this native polysaccharide, and of its modified forms, upon which practical applications can be based.

- 1398 HYDROGENATION OF LINOLENATE. VI. SURVEY OF COMMERCIAL CATALYSTS.  
A. E. Johnston, D. Macmillan, H. J. Dutton, and J. C. Cowan.  
J. Am. Oil Chemists' Soc. 39(6): 273-276. June 1962.

A survey of commercially available hydrogenation catalysts has been made in a search for high-selectivity and low-isomerizing characteristics. Selectivity--the ratio of hydrogenation rates for linolenate to linoleate--was determined on a linoleate-linolenate equimixture under standardized conditions. Ratios of reaction rate constants for nickel catalysts at 140° C. ranged between 1.48-2.71; for palladium catalysts at 25° C., 1.68-1.99; and for platinum catalysts at 25° C., 1.33-1.61. Trans contents of ester mixtures reduced with these three metal catalysts ranged from 18.0-22.8, 16.7-20.5, and 6.3-8.4%, respectively. Although platinum catalysts produced the lowest isomerization, their selectivities were also low.

- 1399 ANALYSES OF LIPIDS AND OXIDATION PRODUCTS BY PARTITION CHROMATOGRAPHY:  
HYDROXY FATTY ACIDS AND ESTERS.  
E. N. Frankel, D. G. McConnell, and C. D. Evans.  
J. Am. Oil Chemists' Soc. 39(6): 297-301. June 1962.

A liquid-partition chromatographic procedure was used to separate hydroxy fatty acids, their methyl esters, and reduced fatty ester hydroperoxides. Mixtures of methyl stearate, of mono- and di-hydroxystearate and mixtures of the corresponding.

free fatty acids were easily separated. Chromatographic determinations for ricinoleate in castor oils compared favorably with the chemical and infrared analyses.

The chromatographic procedure was used to separate hydroxy fatty acids in Dimorphotheca and Strophanthus seed oils. The methyl ester of dimorphecolic acid, the principal hydroxy fatty ester of Dimorphotheca oil, behaved like reduced methyl linoleate hydroperoxide and showed a polarity intermediate between methyl 12-hydroxystearate and methyl 9,10-dihydroxystearate. The 9-hydroxy-12-octadecenoic ester of Strophanthus oil had a larger retention volume than methyl ricinoleate and could be separated from it. The purity of reduced methyl linoleate hydroperoxides and methyl dimorphecolate, isolated chromatographically, was comparable to that reported in the literature.

1400 \*NEW FIELDS BECKON FERMENTATION RESEARCHERS. (Part 2)

Ralph Anderson.

Chem. Week 90(24): 105-112. June 16, 1962.

A two-part study of the U.S. fermentation industry in terms of product value and diversity, breadth of research effort, and growth potential. Research, which has radically reshaped the fermentation industry in the last 20 years, is now opening some new fields. A look at new developments is contained in Part 2.

1401 NOTES ON MUCORALES, ESPECIALLY ABSIDIA.

C. W. Hesseltine and J. J. Ellis.

Mycologia 53(4): 406-426. July/August 1961.

The following new taxa belonging to the order Mucorales are described: Absidia pseudocylindrospora, A. cylindrospora var. rhizomorpha, Gongronella lacrispora, Rhizopus homothallicus, and Rhizopus sexualis var. americanus. The zygosporic stages of these new varieties and species are described with the exception of A. pseudocylindrospora and G. lacrispora. In addition, the zygosporic stage of Circinella angarensis (Schost.) Zycha is described for the first time. Conditions for the formations of zygospores for Zygorhynchus macrocarpus Ling-Young are reported, and this species is determined to be distinct from all other known species of Zygorhynchus.



CONTRACT RESEARCH PUBLICATIONS

[Report of research work done by an outside agency under contract with the U.S. Department of Agriculture and supervised by the Northern Utilization Research and Development Division.]

100-C BIOCHEMISTRY OF THE SPHINGOLIPIDS. XIV. INOSITOL LIPIDS OF FLAXSEED.

H. E. Carter, D. S. Galanos, H. S. Hendrickson, Barbara Jann, Teishi Nakayama, Yasuo Nakazawa, and Brian Nichols, University of Illinois, Urbana.  
J. Am. Oil Chemists' Soc. 39(2): 107-115. February 1962.

101-C COMMERCIAL ELECTROLYTIC CELL FOR PERIODIC ACID PRODUCTION.

C. L. Mantell, Newark College of Engineering, Newark, New Jersey.  
Ind. Eng. Chem., Process Design Develop. 1(2): 144-148. April 1962.

[Report of research work supported with funds provided by the U.S. Department of Agriculture under the authority of U.S. Public Law 480, 83rd Congress, and sponsored by the Northern Utilization Research and Development Division.]

13-PL-480 SEDIMENTATION OF  $\beta$ -LACTOGLOBULIN A UNDER AGGREGATING CONDITIONS.

Lilo M. Gilbert and G. A. Gilbert  
University of Birmingham, Birmingham, England  
Nature 194(4834): 1173-1174. June 23, 1962.

16-PL-480 UNKNOWN GROWTH FACTORS IN DISTILLER'S DRIED SOLUBLES. I. PROOF OF THE ABSENCE OF OROTIC ACID AS VITAMIN B<sub>13</sub>.

A. Dansi, A. Dal Pozzo, L. Rotta e C. Zanini.  
Scientific Institute of Chemistry and Biochemistry  
Milan, Italy.  
Boll. Chim. Farm. 101(5): 380-384. [May] 1962.

## PATENTS

[These patents are assigned to the Secretary of Agriculture.  
Copies of patents may be purchased from the U.S. Patent Office,  
Washington 25, D.C.]

### PREPARATION OF O-GALACTOSYLISOMALTOL.

John E. Hodge and Earl C. Nelson.  
U.S. Patent 3,015,654. January 2, 1962.

O-galactosylisomaltol, a novel intermediate which can be hydrolyzed or pyrolyzed to galactose and isomaltol, is prepared by refluxing lactose or a source thereof and a strongly basic secondary amine in the presence of acetic or phosphoric acid and a tertiary amine buffer, in the further presence of a preferably nontoxic lower alkanol. The intermediate can be incorporated in raw bakery goods or candy before cooking or the pure isomaltol obtained by hydrolysis of the intermediate and extraction may be directly employed where milder heats are involved.

### AZACOLUTIN EXTRACTION FROM S. CINNAMOMEUS VAR. AZACOLUTA.

Renato Craveri, Odette L. Shotwell, and Thomas G. Pridham.  
U.S. Patent 3,017,327. January 16, 1962.

High yields of the antifungal heptaene antibiotic, F-17-C, are obtained by solvent extraction of the mycelia from an aerobic fermentation of Streptomyces cinnamomeus f. azacoluta (NRRL B-1699).

### PHOSPHOMANNAN NRRL Y-2448.

Robert G. Benedict, Allene R. Jeanes, Lynferd J. Wickerham, and S. Peter Rogovin.  
U.S. Patent 3,021,323. February 13, 1962.

Phosphomannan NRRL Y-2448 is obtained in yields of at least 35 percent from a 96-hour, aerobic, whole culture fermentation of a Hansenula holstii yeast, said phosphomannan being a phosphorylated mannan polymer comprising about 850 anhydromannose units arranged in 1,3-linked main chains, an average every fourth anhydromannose unit of which is crosslinked through a fifth anhydromannose unit having on its number 6 carbon atom a mono-potassium phosphate group which is further bound in di-ester linkage, said phosphomannan being further characterized by comprising about 3.3 percent phosphorus, by having a Somogyi-derived average molecular weight of about 157,000, a specific rotation in 0.01 M KCl of +102°, and by having an atypical concentration-related viscosity response in aqueous solution, said viscosity response consisting of an increase to a maximum at a polymer concentration of about 1.5 percent followed by a decrease as the polymer concentration is further increased from the level of about 1.5 percent to the level of about 3 percent, and then an increase as the concentration of the polymer is further increased from about the level of 3 percent to a level of at least about 5 percent.



#### PRODUCTION OF UNDENATURED DEBITTERED SOYBEAN PRODUCT.

Gus C. Mustakas, Edward L. Griffin, Jr., and Larry D. Kirk.

U.S. Patent 3,023,107. February 27, 1962.

A commercial process of treating defatted, substantially undenatured soybean flakes to remove bitter and anti-whipping constituents without reducing the NSI (nitrogen solubility index) to below a value of 68, said process comprising the steps of countercurrently extracting 1 part of said defatted soybean flakes for about 18-36 minutes at 25°-38° C. with 1.5 parts of an alkanol solvent selected from the group consisting of about 95% ethanol and about 91% isopropanol, draining the alkanol-extracted flakes for about 5 minutes, fluidizing the drained flakes for about 2-5 seconds in a closed system high velocity recycle vapor stream mixture heated by indirect steam at 115-120 p.s.i. to 149°-158° C., said vapor stream mixture comprising a said alkanol, moisture, air, and added carbon dioxide, recovering the flakes from the vapor stream, and cooling the recovered flakes in a stream of air.

#### MICROBIOLOGICAL PRODUCTION OF CAROTENE IN A MEDIUM COMPRISING KEROSENE.

Alex Ciegler, Harlow H. Hall, and George E. N. Nelson.

U.S. Patent 3,025,221. March 13, 1962.

Greatly improved yields of beta-carotene are obtained by adding about 5% of kerosene or a kerosene-like petroleum hydrocarbon fraction to an aerobic fermentation of Blakeslea trispora.

#### METHOD OF PREPARING A DRYING OIL AND INTERMEDIATE THEREFOR.

Cecil R. Smith, Jr., Curtis A. Glass, and Ivan A. Wolff.

U.S. Patent 3,027,388. March 27, 1962.

9-Hydroxy-trans,trans-10,12-octadecadienoic acid is obtained by extracting Dimorphotheca seeds with an organic solvent for the constituent glycerides, evaporating the solvent, saponifying to form a mixture of the alkali metal soaps of the constituent fatty acids, acidifying to free the fatty acids from their soaps, and separating the said 9-hydroxy-trans,trans-10,12-octadecadienoic acid from the mixture.

#### CORN DEGERMINATION PRETREATMENT.

Laurence A. Weinecke.

U.S. Patent 3,031,305. April 24, 1962.

Better mechanical degermination and greatly improved yields of large prime grits are obtained by tempering corn kernels with a 0.1% aqueous solution of sodium hydroxide at 65° C. for 2 minutes and drying the thusly treated kernels at ambient temperature.

#### PREPARATION OF HYDROXYETHYLATED FLOURS.

Earl B. Lancaster.

U.S. Patent 3,031,319. April 24, 1962.



A method is used for preparing a new hydroxyalkylated product from cereal flours by adding to the flour a catalyst prepared by mixing aqueous alkali and flour and grinding this mixture to the size desired in the final product. The whole mixture then is reacted with a gaseous alkylating agent.

#### ALLYLATED DIALDEHYDE STARCH AND PROCESS FOR PREPARING SAME.

Lewis A. Gugliemelli, Gary L. Mayer, and Charles R. Russell.

U.S. Patent 3,032,550. May 1, 1962.

Allylated dialdehyde starch having an average DS of at least 1.6 is prepared by extended 35° C. reaction of allyl alcohol with dialdehyde starch in the presence of a weakly acidic swelling agent. The product dissolved in an organic solvent is a film-former, adhesive, and copolymer for synthetic resins.

#### HETEROFUNCTIONAL DERIVATIVES OF DIALDEHYDE STARCHES AND METHOD OF MAKING SAME.

Wilbur C. Schaefer and Charles R. Russell.

U.S. Patent 3,033,851. May 8, 1962.

Dialdehyde starches are treated for at least 2 hours at 10°-25° C. with a 5% solution of liquid chlorine (w/w) to yield polyfunctional starch polymers containing specific and reproducible amounts of carboxyl and methoxyl substitution in addition to significant amounts of residual carbonyl. Some of the carboxyl and methoxyl substitution proceed to form ester and ether linkages. Despite their profound modification, the products retain essentially the BOD's of the parent DAS compounds while acquiring lower and more stable paste viscosities that are necessary for the coating and sizing of paper and textiles. Also, the products from dialdehyde starches that have been oxidized to the extent of at least 10 percent exhibit marked dispersant activity on zinc oxide pastes.

#### PROCESS FOR PREPARING ALLYLATED DIALDEHYDE STARCH.

Lewis A. Gugliemelli, Gary L. Mayer, and Charles R. Russell.

U.S. Patent 3,037,018. May 29, 1962.

Greatly shortened reaction times and improved yields of the allyl acetal of highly oxidized dialdehyde starch are obtained by adding a molar equivalent of 2,2-diallyloxypropane or 2,2-dimethoxypropane to bind water of formation and thus prevent development of an equilibrium in a reaction in which acid-gelatinized dialdehyde starch is reacted with allyl alcohol in the presence of 1% HCl at 40° C. for about 3 hours.

#### LINOLENATE-DERIVED CYCLIC MONOMER FRACTION.

Charles R. Scholfield, John C. Cowan, and John P. Friedrich.

U.S. Patent 3,041,360. June 26, 1962.

Linolenic acid or ester thereof is isomerized at 200°-250° C. with an excess of alkali in ethylene glycol for 7-14 hours to form a mixture comprising a nonurea-adduct-forming cyclic monomer fraction which may be esterified with methanol and/or substantially fully hydrogenated under pressure in the presence of a catalyst.



Similar lists of publication abstracts and patents are available from the other three Regional Utilization Research and Development Divisions of the Agricultural Research Service, U.S. Department of Agriculture. The addresses and fields of research covered are:

| <u>Division</u>                                                                                                    | <u>Principal Fields of Research</u>                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Eastern Utilization Research<br>and Development Division<br>600 East Mermaid Lane<br>Philadelphia 18, Pennsylvania | Animal products: dairy, meat, fats, and leather; plant products: Eastern fruits and vegetables, tobacco, honey, maple, and new crops; and allergen studies.                  |
| Southern Utilization Research<br>and Development Division<br>Post Office Box 19687<br>New Orleans 19, Louisiana    | Cotton and cottonseed; tung fruit; pine gum; Southern fruits and vegetables, including citric, sweetpotatoes, and cucumbers; sugarcane; rice; peanuts; and new crops.        |
| Western Utilization Research<br>and Development Division<br>800 Buchanan Street<br>Albany 10, California           | Western fruits, nuts, vegetables, and rice; poultry products; forage crops; wheat and barley; wool and mohair; sugar beets; dry beans and peas; castor beans; and new crops. |

